

Template and Teaching Tasks for Mathematics
Designed by the Charles A. Dana Center at
The University of Texas at Austin

Inspired and informed by the work of the Literacy Design Collaborative, the Dana Center designed these template tasks from the Standards for Mathematical Practice identified in the Common Core State Standards for Mathematics. When filled in, these templates become teaching tasks that create opportunities for teaching literacy skills in mathematics coursework. Template tasks for each of the eight practices are shown, along with sample teaching tasks that illustrate how to use each template task in designing teaching tasks.

Make sense of problems and persevere in solving them.	
<i>Template Task</i>	<i>Teaching Task</i>
<p>Task 1: After analyzing the problem scenario, write/create ____ (product) to demonstrate your understanding of the problem.</p>	<p>After analyzing the problem scenario, create a <u>table</u> to demonstrate your understanding of the problem. (Grade 7, Grade 8, Grade 9)</p> <p>After analyzing the problem scenario, create a <u>diagram</u> to demonstrate your understanding of the problem. (Grade 7, Grade 8, Grade 9)</p> <p>After analyzing the problem scenario, create a <u>graph</u> to demonstrate your understanding of the problem. (Grade 7, Grade 8, Grade 9)</p> <p>After analyzing the problem scenario, write a <u>question</u> to demonstrate your understanding of the problem. (Grade 7, Grade 8, Grade 9)</p>
<p>Task 2: As you begin solving ____ (a real-world or mathematical problem), give ____ (oral or written) explanation of the meaning of the problem and describe a starting point for solving the problem.</p>	<p>As you begin solving <u>the problem below</u>, give an <u>oral</u> explanation of the meaning of the problem and describe a starting point for solving the problem.</p> <p>The first performance of the Maxwell Middle School Spring Sensations will be next Friday in the new school auditorium. The performance is sold out. The auditorium has 840 seats, and each section in the auditorium seats 60 people. The Maxwell Student Council members have volunteered to usher for the performance. There are 24 members in the Student Council. The Student Council will invite other students to usher so that there will be at least two ushers in each section.</p> <ol style="list-style-type: none"> 1. How many ushers will be needed other than the 24 Student Council Members? Explain your reasoning. 2. About how many people will each Student Council member seat? How did you determine this? <p>(7.RP.3)</p>

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Reason abstractly and quantitatively.	
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Task 3: After reading ____ (real-world problem), create a symbolic representation of the situation described in the problem. Be sure to define the variables used in your symbolic representation.	<p>After reading <u>the problem below</u>, create a symbolic representation of the situation described in the problem. Be sure to define the variables used in your symbolic representation.</p> <p>Roses-R-Red sells roses for a service charge of \$20 plus 75¢ per rose. Flower Power sells its roses for a service charge of \$60 plus 50¢ per rose. Which flower shop offers the best deal? (8.F.4; HSA-CED.2)</p>
Task 4: After comparing ____ (problem situation) to its symbolic representation, write ____ (product) in which you describe how each value or symbol in the symbolic representation relates to situation.	<p>After comparing <u>the problem situation below</u> to its symbolic representation, write <u>an explanation</u> in which you describe how each value or symbol in the symbolic representation relates to the situation.</p> <p>Roses-R-Red sells roses for a service charge of \$20 plus 75¢ per rose. Flower Power sells its roses for a service charge of \$60 plus 50¢ per rose. Which flower shop offers the best deal? (8.F.4; HSF-LE.5)</p>
Construct viable arguments and critique the reasoning of others.	
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Task 5: After analyzing ____ (data), write one or more conclusions based on the data and write ____ (product) in which you justify the conclusion.	After analyzing <u>data from the measuring the angles of different triangles</u> , write one or more conclusions based on the data and write <u>an argument</u> in which you justify the conclusion. (8.G.5)
Task 6: After reading and analyzing ____ (text), write a critique in which you trace the reasoning presented. L2 Identify and explain any flaws in the reasoning. L3 Correct any flawed reasoning presented.	After reading and analyzing a <u>dissection proof of the Pythagorean Theorem</u> , write a critique in which you trace the reasoning presented. L2 Identify and explain any flaws in the reasoning. L3 Correct any flawed reasoning presented. (8.G.6)
Task 7: [Optional question] After analyzing ____ (content/text), write ____ (product) in which you justify ____ (content). L2 Support your discussion with evidence from the text(s).	<p>After analyzing <u>the properties of integer exponents</u>, write <u>an explanation</u> in which you justify <u>how the definition of the meaning of rational exponents follows from extending the properties of integer exponents to those values</u>. (HSN-RN.1)</p> <p>After analyzing <u>properties of rational and irrational numbers</u>, write <u>an explanation</u> in which you justify</p>

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	<ul style="list-style-type: none"> • <u>why the sum or product of two rational numbers is rational;</u> • <u>why the sum of a rational number and an irrational number is irrational;</u> • <u>why the product of a nonzero rational number and an irrational number is irrational.</u> <p>(HSN-RN.3)</p> <p><u>Are all square roots and cube roots irrational?</u> After analyzing <u>the definition of an irrational number</u>, write a <u>response paper</u> in which you <u>justify your response to the question</u>. Support your discussion with evidence from the text. (8.NS.1)</p> <p><u>Is there an association between having a college degree and employment?</u> After analyzing a <u>two-way table of the bivariate categorical data from a study</u>, write an <u>explanation</u> in which you <u>justify your response to question</u>. (8.SP.4; HSS-ID.5)</p>
Model with mathematics.	
<i>Template Task</i>	<i>Teaching Task</i>
Task 8: After reading ____ (scenario/problem) create a model for ____ (content) and write ____ (product) in which you discuss the appropriateness of your model for ____ (content). L2 Address specific conditions under which the model fits or fails.	After reading <u>the information about t-shirt sales</u> , create a model for <u>t-shirt sales and revenue</u> and write a <u>short report for a business owner</u> in which you discuss the appropriateness of your model for <u>predicting the amount of revenue for a given number of shirts sold</u> . Address specific conditions under which the model fits or fails. (7.EE.4; 8.F.4; 8.SP.2; HSA-CED.2; HSA-CED.3)
Use appropriate tools strategically.	
<i>Template Task</i>	<i>Teaching Task</i>
Task 9: After studying ____ (problem, situation), choose a tool (or tools) to ____ (analyze, solve, represent, compare) the ____ (problem, situation) and write a justification for tool you chose.	After studying <u>the E-radio and Mega radio subscription rates problem</u> , choose a tool or tools to <u>compare the rate plans</u> and write a justification for the tool you chose. (8.EE.5)

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Attend to precision.	
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<p>Task 10: [Optional question] After studying ____ (text), write ____ (definition, statement, explanation) that communicates precisely ____.</p>	<p>What is a <u>mathematical function</u>? After studying <u>the vending machine examples</u>, write a <u>definition</u> that communicates precisely <u>what it means for a mathematical relationship to be a function</u>. (8.F.1; HSF-IF.1)</p> <p>After studying <u>the pizza costs with and without delivery</u>, write an <u>explanation</u> that communicates precisely <u>how you can determine if a relationship is proportional</u>. (7.RP.2)</p> <p>What is a <u>statistical sample</u>? After studying <u>the student survey example</u>, write a <u>definition</u> that communicates precisely <u>what it means to sample a population when collecting data to answer a statistical question</u>. (7.SP.1)</p> <p>How can you use what you know about the two perfect cubes nearest to 20 to <u>estimate a 20 cubic centimeter cube's edge length</u>? After studying <u>your answer</u>, write an <u>explanation</u> that communicates precisely <u>a description of the length of the edge of a 20 cubic centimeter cube</u>. (8.NS.2)</p> <p>After studying articles on the <u>pitch of a roof</u>, write an <u>explanation</u> that communicates precisely <u>what the pitch of a roof is and how right triangles are used to determine the pitch of a roof</u>. (8.EE.6; HSG-MG.3)</p>
Look for and make use of structure.	
<i>Template Task</i>	<i>Teaching Task</i>
<p>Task 11: After investigating ____ (content), write/create ____ (product) in which you describe ____ (pattern[s], connection[s], structure[s]) ____ (in/among/between) ____ (content).</p>	<p>After investigating <u>the volume formulas for prisms and pyramids</u>, write a <u>comparison response</u> in which you describe a <u>connection between the formulas and their corresponding solids</u>. (7.G.6; HSG-GMD.1)</p> <p>After investigating a table of data comparing side lengths of squares to their <u>areas</u>, write a <u>paragraph</u> in which you describe <u>the pattern in that relationship</u>. (8.F.3)</p> <p>After investigating a table of data comparing side lengths of a squares to their <u>areas</u>, create an <u>algebraic model</u> in which you describe <u>the pattern in that relationship</u>. (8.F.3)</p>

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Look for and express regularity in repeated reasoning.	
<i>Template Task</i>	<i>Teaching Task</i>
Task 12: After investigating ____ (content), write/create ____ (product) in which you describe a ____ (general method or shortcut) for ____ (content).	After investigating <u>the approximation of the edge length</u> , write <u>an explanation</u> in which you describe <u>a general method to continue improving your approximations for the edge length</u> . (8.NS.2)

Product List

- | | |
|---|---|
| <ul style="list-style-type: none"> • Paragraph • Response (written or oral) • Table • Conjecture • Analysis • Argument • Proof | <ul style="list-style-type: none"> • Diagram • Graph • Model • Explanation • Conclusion • Justification • Short report |
|---|---|

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The following teaching tasks were designed from template tasks appearing in LDC Collection 2. The prompts engage students in writing in response to reading a variety of print and visual texts. Written products are multiparagraph compositions, including response papers, reports, and memos.

Argumentation Task 2 (Analysis)

Are numbers invented or discovered? After reading the two articles, write a response paper in which you address the question and argue which position is the most viable and explain why. Support your position with evidence from the texts. (Grade 7, Grade 8)

Argumentation Task 4 (Comparison)

After reading and investigating the topic **Patterns and proportional relationships**, write a brief essay in which you compare proportional linear relationships and non-proportional relationships and argue how you can tell whether a given relationship is proportional. Support your position with evidence from the texts. (7.RP.2a)

Informational or Explanatory Task 12 (Definition)

What makes a relationship a function? After reading and studying the topic **Functions**, write a response paper in which you define “function” and explain if the two sample relationships represent functional relationships. Support your discussion with evidence from the text. (8.F.1; HSF-IF.1)

Informational or Explanatory Task 14 (Description)

How old is the Towers of Hanoi problem? After reading historical articles on the Towers of Hanoi problem, write a report in which you describe its history and address the question. Support your discussion with evidence from the texts. (Grade 7, Grade 8, Grade 9)

How can you tell when a relationship is a function? After reading and studying the topic **Functions**, write a response paper in which you describe what makes a relationship a function and address the question. Support your discussion with evidence from the text. (8.F.1; HSF-IF.1)

Informational or Explanatory Task 16 (Procedural-Sequential)

After reading a recipe for meatloaf for 4 people, write a new recipe in which you relate how to increase the recipe for 40 people. Support your discussion with evidence from the text(s). (7.RP.3)

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Informational or Explanatory Task 18 (Synthesis)

After researching texts on different proofs of the Pythagorean Theorem, write a report in which you explain and compare at least two different proofs. Support your discussion with evidence from your research. (8.G.6; HSG-SRT.4)

Informational or Explanatory Task 19 (Synthesis)

How do forensic scientists use mathematics to determine time of death? After reading informational texts on forensic science methods, write a report in which you explain methods used by investigators to determine the time of death of a victim. Support your discussion with evidence from the texts. (Grade 7, Grade 8, Grade 9)

Informational or Explanatory Task 21 (Analysis)

In which 7th grade math class do students spend the most time on homework? After reading the data describing minutes spent on homework for two different math classes, write a report in which you analyze the data and compare the amount of time spent on homework for the two classes using graphs, measures of center, and measures of variability, providing examples to clarify your analysis. (7.SP.4; HSS-ID.3)

Informational or Explanatory Task 23 (Comparison)

After reading the graph representing $f(x) = \sqrt{x-2}$ and the table representing $g(x) = x^2 + 2$, write a response paper in which you compare the key features of each function represented. Support your discussion with evidence from the texts. (HSF-IF.4)